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# Balance, Cogito and Dott: Exploring Media Modalities for Everyday-life Reflection

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## Abstract

Reflection in and on everyday life can provide self-insight, increase gratitude and have a positive effect on well-being. To integrate reflection in everyday life, media technologies can provide support. In this paper, we explore how both media creation & use in different modalities can support reflection. We present the ongoing work of designing and building Balance, Cogito, and Dott, focusing on media in audible, textual and visual form. We discuss our research-through-design process and address the differences between modalities in terms of interaction, tangibility, and the integration in everyday life.

## Author Keywords

Reflection; Media Technology; Design for Remembering

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

## Introduction

We all accumulate vast amounts of media (photos, souvenirs, e-mails etc.), often focused on special events such as holidays. Capturing more mundane aspects of life is far less common, even though our

experiences of everyday can become valuable memories [9,16]. Reflection *in* and *on* everyday life can help to appreciate our mundane experiences and can provide self-insight, support behavior change and improve wellbeing [10]. We explore the potential of media technology to support such reflective remembering [12]. With the design of three concepts we explore the use of different media to support reflection in both the creation and retrieval of media. The three concepts are complementary by exploring audio; visual media and text, each integrated into everyday life practices.

### Reflection & Media

Design for reflection has increasingly become a topic of interest within HCI [1, 4, 10]. With everyday life reflection, we aim to support a broad type of reflection that incorporates multiple aspects of life [10]. Although most people engage with reflection throughout their lives, it can be very challenging and systems could take a supporting role in this process [4, 10]. Elaborate overviews of design for reflection are given elsewhere by domain [2], level of reflection [4] or adopted strategy [10]. Here, we focus on how *media* can be used to support reflection.

Media and reflection relate in two main ways. First, during media *retrieval*, media can serve as an external trigger for reflection. Photos or other media can bring things to mind otherwise forgotten [15], provide new information or support comparison. However, media as a trigger is not a singular interaction, the way people engage with their media or data often involves an iterative process of preparation, collection, integration and reflection [7].

Secondly, the process of media *creation* can be reflective as well. For example, when capturing experiences people reflect on what is 'photoworthy' and 'reframe' the situation [8]. Choosing how to represent a thought, feeling or experience in media can be reflective. Such expression-driven reflection [10] is for example seen in diary writing and leveraged in creative therapies, but also applied in technologies such as the design of a color picker in Affective Diary [14]. Both reflection in creation (or expression) and reflection in retrieval can become connected when media is created with the intention to trigger reflection in the future.

### Design Research Process

We adopt a research-through-design process [5, 17] to explore the potential of media supported reflection. Rather than exploring a single design we have chosen to develop three concepts in parallel, to focus on the design space emerging between these instances [5]. Rather than focusing on either reflection in creation or reflection in retrieval we designed all concepts to facilitate both. To further differentiate from existing technology for reflection we designed the concepts with the following qualities. The concepts are *open-ended* in terms of what is reflection upon. The threshold to create media is lowered by being *small* and *light-hearted*. The created media is small; a brief text, short audio fragment or single visual, which can be quickly created or retrieved. The interactions are quick and lighthearted, rather than emotionally heavy (which for example diaries can be). Finally, all concepts have a *tangible presence* in the home environment and are *integrated* in everyday life practices.

With the design and evaluation of the concepts we address the following aims: explore the differences

## Exploration for Balance

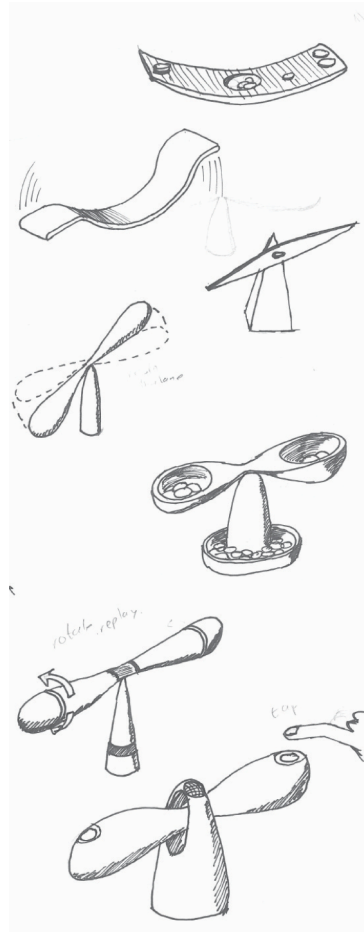


Fig. 1 Sketches of the development of balance

between different media modalities and their effect on capturing and reflecting, explore differences between reflection driven by expression (media creation) and retrieval (media use), explore how aspects of system openness, initiate and interaction support integrating reflection in everyday life [10].

Below, we will describe each concept, illustrated with explorations from the design process and a photo of the current prototype. As the work is ongoing, the different concepts are in varying states of implementation.

### Audio Concept: Balance

We explore the audio modality in the Balance concept. An abstract object (inspired by a traditional measuring scale) is used as a personal voice-recorder to collect daily reflections. The concept is intended to be used when coming home after a day of work. This transition is suitable for reflection and often evaluative in nature: how was my day? This evaluation is stimulated by recording voice memos on two sides, representing opposite aspects of life, e.g. positive and negative, or work and home. The concept stimulates reflection in media creation by requiring to put thoughts into words. Additionally, each entry adds weight to the balance, depending on the force used when tapping to record. As such, the object becomes an abstract representation of the balance in everyday life and stimulates adding thoughts on the opposite site.

For retrieval, we propose three different scenarios, two focused on short triggers and one for more elaborate exploration. One can tap the center of the device to replay one of yesterday's recordings to continue these thoughts (for instance during morning commute). Secondly, one can turn either side of the Balance to get

a random trigger from that side: for example requesting a positive trigger for mood regulation [3] or a negative trigger to revalue past reflections [6]. For more elaborate reflection, the past recordings can be browsed in a personal online database.

### Design & Implementation

Different shapes have been explored using dials, weights or internal weight shifting (see Figure 1). Figure 2 shows the current mock-up prototype. Balance is implemented using a Raspberry Pi, connected to power and the internet. Through a USB soundcard, a microphone and speakers are connected, integrated into the central 'foot' unit. Both sides are equipped with a pressure sensor to measure the "weight" added to a recording. The different positions could be prototyped using a servo that moves the arm. However, this results in a more mechanical feel. For a more natural interaction that 'wobbles' when tapping or changing position, we aim to implement an internal weight shifting. We are currently in the process of prototyping this. We aim to implement these aspects in a wooden exterior with a warm rather than technical feel.

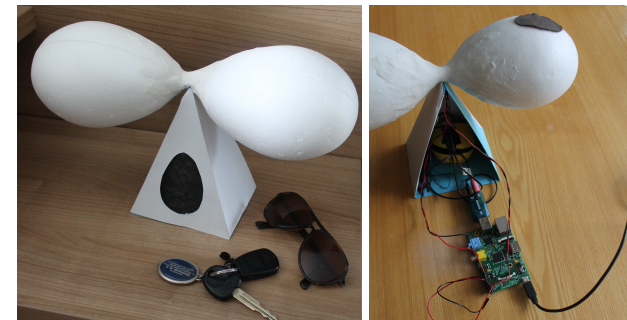


Figure 2: *Left*: Balance mock-up. *Right*: Implementing recording and replaying in the prototype in progress.



### Sketches of Cogito

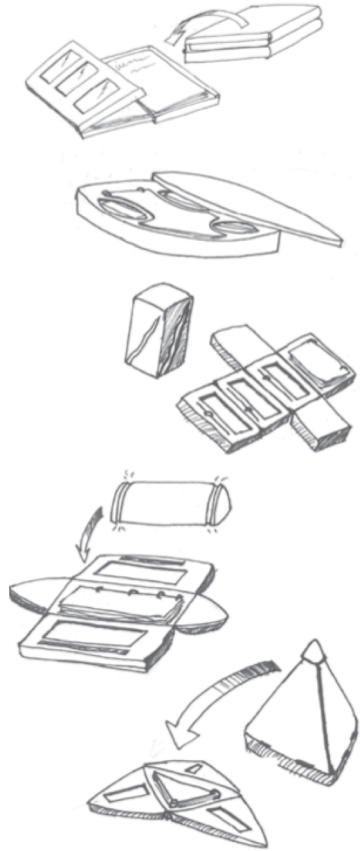


Fig. 3 Exploring how to combine multiple small screens and room for writing in an unfolding object.

### Text Concept: Cogito

Writing is considered the oldest medium for reflection, especially in private diaries but increasingly in social digital practices such as online fora and blogs [11]. Inspired by these developments we have designed Cogito to send 'messages to the self'. The system combines the low threshold of mobile messages with the potential of manual writing, combining the benefits of both. Short text messages can be sent throughout the day during brief moments of realization, experienced emotions or short breaks. These are mainly intended as notes for future elaborations, rather than expressive reflection in themselves. The main reflection with Cogito is intended during media retrieval. The Cogito object stores the messages and gets 'filled'. To stimulate frequent reflection, Cogito attracts attention when 'empty' or when 'full'. When no messages are sent for a while, the object slowly and faintly glows to stimulate more messages to be sent. The object becomes 'full' when a certain amount of messages are sent but have not been further explored or reflected on, which results in a more active, restless blinking of the object.

The object can be opened up to explore the content, showing several messages together to allow for comparing and abstracting [13]. The user can change the message on each segment to find inspiring combinations. The center holds a paper note block to support further drawing connections, doodling or writing for additional reflection. By combining digital and hand-written text we aim to leverage the benefits of both. Digital message can easily be created on the go, easily stored, combined and browsed. Manual writing could stimulate further expression or a 'slow' reflection.

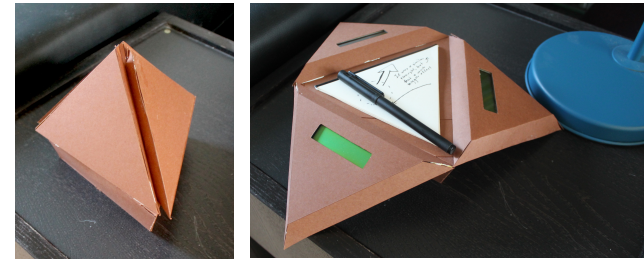


Figure 4: Cogito mock-up. Left: closed state, wooden exterior where lights will be implemented in the edges. Right: opening the segments reveals multiple screens and a paper notepad.

### Implementation

This concept is currently in an initial state of implementation. After deciding on how to combine digital and hand-written text, we are now focusing on exploring the form factors of the Cogito object. For the mobile text, we aim to use a frequently used mobile messaging platform (for example Whatsapp) to integrate into current everyday practices. These messages will be retrieved by a Raspberry Pi and processed to be displayed on one of several LCD displays in the Cogito object. Figure 4 shows a mock-up, both in open and closed state. We use light in the edges of each segment to communicate the state of the device when closed.

### Visual Concept: Dott

The concept Dott will stimulate users to create abstract visual art based on everyday life experiences. The system includes a mobile application and custom display in the home. A selection of photos can be chosen to transform into an abstract representation, generated through automatic image processing. To stimulate reflection in creation, several parameters of the visualization can be tweaked. We are mainly

### Visual Exploration Dott

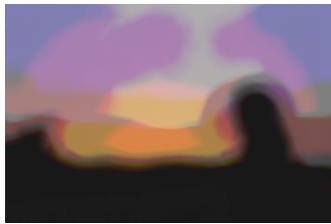
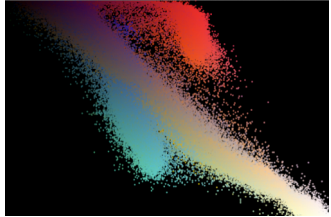


Figure 5: Exploration of generated visualizations based on photos.

interested in using the colors of the photos, by choosing different sources and tweaking parameters visualizations become brighter, darker, more calm or chaotic. Reflection is stimulated by considering how to represent experiences or emotions in such an abstract form. In the home, reflection is triggered by the artwork as a peripheral display, either when noticed by the primary user or by others. To stimulate frequent change, the artwork will slowly fade after 24 hours. In addition to adding new work, past visualizations can be browsed in the app and displayed again.

#### *Implementation*

A first version of the Dott system is implemented, with the application prototyped on the Android system. The current application can create one visual style, but we aim to develop more in the future. Currently, the visual consists of colored circles of which the size, number, and transparency can be tweaked (see the bottom two images of Figure 5). From the phone, the created artwork is uploaded to a dedicated Dropbox folder. The artwork-display is created using an Android tablet covered with thin canvas and lined with a frame to replicate an artwork, which retrieves the uploaded images from Dropbox and displays them (see Figure 6).

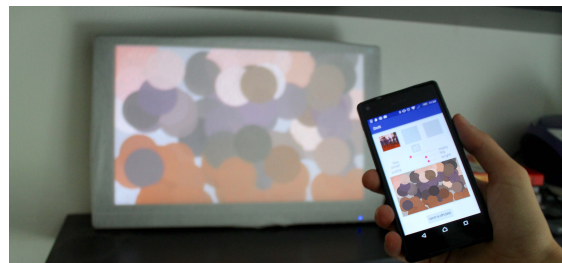


Figure 6: Dott running on Android phone and custom display.

### Discussion & Conclusions

Balance, Cogito and Dott have been developed in parallel. By reflecting on the similarities and differences between these concepts, the following topics raised interesting discussion and questions for future work.

#### *Modalities & Tangibility*

All the forms of digital media used to support reflection are intangible in and of themselves. In the designs, they are manifested on displays (textual or visual) or exist only in space and time when played (audible). The media is given a presence by being embodied in tangible objects. Especially in Balance and Cogito, the tangible interaction plays an important role. The movement and configuration in Balance provide an extra layer of information and allow for interaction with the audio. The challenge of browsing through an intangible modality as audio has also influenced the retrieval scenarios in which randomness plays an important role. In Cogito, opening the object opens up its content: one can dive into the thoughts and memories. Different messages are positioned separate from each other, providing more room for comparison. We included a possibility for handwriting in this concept as we perceive the slowness and directness of this to be very suitable for reflection; more so than digital text. One question that arises is whether reflection will mainly focus on the content of the media, or if the object itself becomes the subject of reflection?

#### *Modalities & Interaction*

The different media, by their nature, are interacted with in different ways. The textual media requires full attention because only when read the content reveals itself. Visual media can be directly looked at but can blend into the periphery as well. In contrast, the

presence of audio binary: either the audio is not perceived ('hidden in the object') or is being played, and therefore present throughout the space, even when physically turning away from it. All types of media are intended to trigger reflection through interaction. However, the media that can not be perceived without interaction (textual or audible), does not provide such a reflective trigger directly. Rather, the object by its movement (Balance) or light (Cogito) provides this trigger to *use*. How will the separation between trigger-to-use and trigger-to-reflect influence the reflection of people? Does it make triggering easier or does it add an additional threshold?

#### *Visibility and Disclosure*

The home is a semi-public space, but reflection can be very personal. During the design process, it became clear that personal content should not be directly "on display". The different modalities required different strategies to fulfill this requirement. The visual media of Dott remains private through a high level of abstraction. For both Balance and Cogito, the private content is hidden within the object, while the triggers to use (light and movement) do not disclose personal information. Will people perceive the different concepts to be equally private? Or will they disclose different levels of personal information in the different concepts?

In the future, we will use these concepts in a semi-comparative home study. By comparing between and generalizing across these concepts we aim to gain more insight in how to support reflection with personal media in everyday life.

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